INTRODUCTION

Emotion regulation is a construct that has earned a great deal of attention in the field of developmental psychology over the past few decades and has been studied in relation to a number of developmental phenomena. For example, emotion regulation is associated with infant attachment security (Braungart & Stifter, 1991; Cassidy, 1994; Kochanska, 1998), social competence (Calkins, Smith, Gill, & Johnson, 1998; Spinrad, Stifter, Donelan-McCall, & Turner, 2004), and aggressive behavior (Calkins, 1998). There remains ambiguity in the literature over a precise definition of this term, but one common definition of emotion regulation is "systematic changes associated with activated emotions" (Cole, 2004). These systematic changes can occur at multiple levels, including the physiological and behavioral levels (Buss & Goldsmith, 1998; Cole, 2004; Kopp, 1989; Putnam & Stifter, 2002). For example, young children who are distressed may engage in behaviors that are assumed to reduce distress, such as distraction or self-soothing through thumb- sucking, hair twisting, or using a security object.

Emotion itself is a construct that requires some explanation in order to understand the processes involved in emotion regulation. However, there is no consensus as to the definition of emotion. One difficulty in studying emotions is establishing construct validity or precisely defining the thing that is to be measured as an indication of emotion. Most emotion regulation theorists share similarities in their theoretical perspective on emotion. More specifically, Cole (2004) notes that emotion is typically viewed from a neo-Darwinian perspective, in which emotions have evolved because of their adaptive value for survival. Within this neo-Darwinian framework, emotions are believed to aid in

appraising aspects of the environment. Emotions serve an appraisal function by allowing an individual to determine the significance of an event and evaluate its meaning.

One way of operationally defining emotions is through behavioral displays, which may be identified through certain patterns of behavior that are influenced by the appraisal function that emotions serve. For example, the emotion of fear may be experienced when an environment or situation is perceived as threatening, thereby indicating the need to act in a certain way such as fleeing. In this example, the behavioral pattern of fleeing is one indication of the activated emotion of fear. The observation of certain behavioral patterns that occur in similar contexts, and which are not seen in contrasting contexts, is a clue to defining the activated emotion. The behavioral display is affected by a number of variables including the environmental context. The context in which emotional arousal occurs will affect the evaluation of the emotional arousal, thereby eliciting a certain behavioral display that has become adapted to this environmental context. From experience with the emotional arousal, the environment in which it occurs, the behavioral display, and the changes that are incurred within the individual and the environment, children begin to associate these events so that future behavior will be adapted by this experience. Further, some aspects of an environment elicit emotional arousal but also require emotional arousal to be modified in some way. For example, the emotion of fear may be experienced when standing on stage in front of an audience while giving a speech. Although the activated emotion indicates the need to flee, the situation requires that this emotion to be modified in order to give the speech. Thus, some situations in which emotional arousal occurs will require modified or regulated arousal.

During development, the behavioral display of an activated emotion is often shown to change with age; specifically, older children typically show less overt behavioral expression than younger children (Kopp, 1989; Spinrad et al., 2004). One explanation for this change over time is the development of control mechanisms, or emotion regulation, that aid in the modulation of emotional arousal and thus changes the behavioral display. Therefore, at a young age, the behavioral display may be a more pure measure of an activated emotion.

Related to definitional ambiguities surrounding the construct of emotion, a major theoretical debate centers on whether emotion regulation can be meaningfully separated from the experience of emotional arousal (Campos, 2004). In the current study, I adopt the perspective of theorists such as Cole (2004) who argues that emotion regulation can be separated from emotional arousal. According to this perspective, emotion regulation involves processes that occur in response to the onset of emotional arousal; these regulatory processes serve to modify emotional arousal. In general, the term reactivity refers to emotional arousal in the central and autonomic nervous systems that occurs in response to certain stimuli in the environment. Emotion regulation occurs in response to reactivity and includes those processes and strategies that modify (decrease or increase) reactivity. Researchers tend to agree that emotion regulation, as a construct, is important in the conceptualization of "how emotions organize attention and activity and facilitate…actions to overcome obstacles, solve problems, and maintain well-being" (Cole, 2004, p.318). Emotion regulation recognizes that a certain amount of control appears to be present with the process of emotion, and may be a mechanism by which a

person can adopt behavioral strategies in order to manipulate emotions and enable successful achievement of desired goals.

Regulatory processes show a normative pattern of development in young children. This is evidenced by newborns who are limited mainly to reflexive behaviors, such as sucking, and through the infant's gradual experience with changes in arousal that are associated with particular behaviors, the child shows continued use of such behaviors during the experience of arousal. For example, an infant who experiences a decrease in distress from sucking a pacifier or a thumb will over time associate decreased arousal with the behavior of sucking and will be more likely to engage in that behavior in the future as a means of reducing arousal. Kopp (1982) describes six stages of normative development to identify the patterns of development of self-control or self-regulation. Although Kopp's stages focus on the broader construct of behavioral self-regulation or self-control, emotion regulation is one key component of self-regulation because self-regulation often involves the ability to regulate negative emotional arousal or reactivity. The behavioral repertoire of the child develops along with cognitive capacities and encompasses the learned strategies the child has used to interact with the world. These changes in children's abilities are associated with cognitive development also occurring during this period. Between approximately 1 and 2 years, children show increased compliance to a caregiver's requests when the caregiver is both present and absent, which suggests that the child is developing autonomous monitoring of his/her own behavior (Kochanska, 1998). Caregiver-child interactions also show reciprocal patterns of behavior with apparent awareness of appropriate give-and-take responses. These interactions demonstrate that children are increasingly able to monitor their own

behaviors and control them (Kopp, 1982). Most notable are the improvements in memory and problem solving skills (Kopp, 1974, 1982). Between approximately 24 and 36 months, children improve upon the ability to self-monitor their own behaviors in the absence of the caregiver and to adapt to situations without further reminders from the caregiver. This flexibility in self-monitoring indicates that more mature forms of control are being implemented. For example, when a parent tells a young child to clean up toys or to stop engaging in a particular behavior, complying with the parent's request often requires the child to manage frustration or anger.

Emotion regulation tends to follow a normative developmental sequence, as described above; however, at any given age there are also individual differences in young children's use of emotion regulation strategies. These variations are likely to be due to a number of factors, some of which are "intrinsic" to the child, most notably temperament, and some of which are "extrinsic", most notably caregiver behavior. In general, temperament refers to individual differences that appear relatively early in life, are heritable, and are somewhat stable over time. Among temperament theorists, there is general agreement that individual differences in both reactivity and regulation are related to temperament (e.g., Posner & Rothbart, 2000). For example, "distress to limits" or "easily frustrated" is used to describe how infants and children respond to limits placed on their behavior. A child who is high on the temperament dimension of "distress to limits" will express distress in response to restrictions on her movement or goals (e.g., being placed in a car seat, being restricted from the exploration of certain objects). A child low on this dimension will rarely respond with distress to these events. Caregiver behavior is also hypothesized to affect the way in which temperament characteristics are

manifested (Calkins, 1994, 1998, 2002; Putnam & Stifter, 2002). The way the caregiver interacts with the child may be influenced by the child's temperament as well as influence the way the child behaves. This interaction is described further in Calkins' (1994) model of factors that influence emotion regulation.

Calkins (1994) posits a model, similar to other models in the field, which indicates the internal and external components that are hypothesized to affect individual differences in emotion regulation. The model begins with the neuroregulatory mechanisms, the central (CNS) and autonomic (ANS) nervous systems. These systems direct reactivity that occurs in response to an event in the environment. Individual differences in reactivity, including "distress to limits", are believed to be temperamentally based. The next level in the model consists of the behavioral traits that are the outward expression of individual differences in reactivity. Behavioral traits vary across children based on these individual differences in reactivity to specific types of environmental events. Within Calkins' model, behavioral traits affect the child's regulatory style directly; a highly reactive child is hypothesized to have a more difficult time regulating this reactivity because of its characteristic intensity.

The caregiver is hypothesized to react to the behavioral traits of the child and to directly affect the regulatory style of the child. Thus, the expression of the behavioral trait becomes shaped by the caregiver's behavior as the caregiver affects regulatory strategies in the child (Calkins & Johnson, 1998). The caregiver can also have an indirect effect on the regulatory style of the child by influencing the development of the child's beliefs and cognitions about the world. For example, if the child is highly distressed by limits (i.e., easily frustrated) and is in a restrictive situation, such as being placed in a car

seat, then the caregiver who adds additional restrictions on behavior such as demands to "sit still" will contribute to the belief that the environment is hostile. As a result, the child will experience frustrating events with greater intensity and will be less adept at managing their high level of reactivity in future frustrating situations. The beliefs and cognitions that the child holds are initially shaped by the caregiver's behavior, but the child's beliefs will also come to affect both the way that she responds to the caregiver and her own regulatory style.

In Calkins' model, the caregiver is hypothesized to be an important influence on the development of individual differences in emotion regulation; this is also true of other models of emotion regulation (e.g., Kopp, 1989; Thompson, 1994). However, most of the empirical literature on individual differences in young children's emotion regulation looks only at the child's strategies for regulation in situations designed to elicit reactivity, particularly anger or frustration. For example, research with young children often uses structured laboratory observations in which the child is presented with an attractive stimulus and then is prevented access to it (e.g., by putting it out of reach or in a box that the child cannot open). The child's level of distress (reactivity) and their other behaviors (regulatory strategies) are coded.

Some research examining caregiver behavior in relation to children's reactivity and regulation has coded maternal behavior in non-emotionally arousing tasks and related it to the child's reactivity and regulation in a separate, emotionally arousing situation (Feldman, Greenbaum, & Yirmiya, 1999; Mauro & Harris, 2000). The rationale for correlating these two situations is that a caregiver's interaction with a child in a particular context will affect the behavior of the child in multiple contexts, including emotionally

arousing situations; therefore, it is valid to observe maternal behavior in a non-emotionally arousing context because this behavior is hypothesized to influence the strategies that the child employs independently in an emotionally arousing context (Calkins, Smith, Gill, & Johnson, 1998; Cassidy, 1994). For example, Calkins et al. (1998) observed mothers and their 24-month old children in a number of different laboratory tasks designed to elicit positive or negative emotional arousal and related the mother's interactive style to the child's emotional arousal and emotion regulation. Maternal behavior was coded from non-arousing mother-child tasks such as structured play, pretend play, and a teaching task, where the instructions for the mother were to demonstrate a toy to the child, to play as they normally would at home, and to teach the child about a toy, respectively. Maternal interactive style was divided into two broad categories of either positive or negative interactions. The frequency of verbal responses and behaviors by the mother such as scolding, threats, restricting movements, verbal control (negative) or praise, laughter, encouragement, and positive feedback (positive) were taken from each task as summary scores for negative or positive guidance. The scores were then standardized as a measure of maternal interactive style across episodes. Child emotional reactivity was measured by latency and duration of smiling and of fussing during a baseline episode (where the child watched a 5-min cartoon video in addition to having electrodes placed on his/her chest). The duration of smiling was analyzed during a positive emotion task (puppet play), and a summary score of the standardized reversed latency to fuss measure plus the standardized duration of fussing was measured during the two negative emotion tasks (one in which the child was prevented access to a toy and another in which she was confined to a high-chair). In this

way, a standardized summary score of reactivity was created for each task. Child emotion regulation was measured by time spent demonstrating a certain regulatory strategy, such as orienting toward the task object, distraction, or aggression/venting behavior.

Results showed significant correlations between children's regulation and reactivity in each of the tasks. For example, during the positive emotion task (puppet play), focusing on the puppet was negatively related to smiling, during the negative emotion task involving an inaccessible toy, negative reactivity was inversely related to distraction and during the high chair task negative reactivity was positively related to venting and negatively related to distraction. Maternal interactive style was not significantly related to any of the reactivity measures used in the study. However, there was a relation between maternal interactive style and child's emotion regulation during negative tasks but not during positive tasks. Specifically, maternal negative control was positively correlated with the duration of time spent focusing on the object and was negatively correlated with distraction during a negative task, like barrier to toy. These findings indicate that maternal interactive style is related to the child's ability to regulate emotional arousal, which in turn appears to relate to the child's reactivity. Specifically, mothers who use more controlling strategies during interactions with their children have children who are less likely to use adaptive regulatory strategies when managing their own emotional arousal.

While caregiver behavior in any given context may affect the child's behavior in other contexts, in order to better understand the socialization of emotion regulation it appears equally important to examine caregiver behavior in contexts in which children

are experiencing emotional arousal. A few studies have coded maternal behaviors during situations designed to elicit emotional arousal in children and related these behaviors to children's emotional reactivity and regulation (Grolnick, Kurowski, McMenamy, Rivkin, & Bridges, 1998; Spinrad, Stifter, Donelan-McCall, & Turner, 2004). In general, studies that correlate the mother's use of certain regulatory strategies in one situation and the level of distress of the child in a second independent situation show that there is an association between what mothers are doing in one context and how their children regulate emotional reactivity independently. Grolnick et al. (1998) coded maternal behaviors during a delay task in which the mother was allowed to interact with her child ("mother-active") and related these to the child's level of distress during an independent delay task; the two delay tasks were counterbalanced across dyads. Delay tasks are widely used as a means of eliciting frustration in young children. The sample included 12, 18, 24, and 32-month-olds, and children's reactivity and regulation strategies were coded during an independent delay situation, in which the mother was instructed not to interact with the child. They found that children's level of negative reactivity (distress) in the independent delay situation was correlated with mothers' strategies in the mother-active delay task. Specifically, they found mothers' strategies of active engagement, redirection of attention, reassurance, and physical comforting during the parent-active delay task were positively correlated with higher levels of distress in their children in the independent delay task. Mothers who did not interact with their children or used a behavior not included in the strategy coding had children who were less distressed during the independent delay task. This finding suggests that the way that mothers interact with children in an emotionally arousing context may affect the way the children manage their

own emotions independently. Although this approach makes it possible to see how caregiver and child behaviors are related, the temporal relation between maternal and child behavior is not clear. That is, are certain maternal behaviors reliably followed by increases or decreases in child distress?

Spinrad et al. (2004) examined the specific strategies employed by the mother during several emotionally arousing tasks with her child at 18 months and again at 30 months and related these strategies to the child's response to a disappointment task five years later. At both the 18 and 30 month visits to the lab, the mother and child participated in a standard clean-up task, where the mother instructed the child to clean up toys with which they had spent a period of time playing. At 18 months of age, the mother and child also participated in a toy removal task intended to elicit frustration, and at 30 months they participated in the placement of electrocardiogram (ECG) electrodes on the child's chest as a means of eliciting negative emotional arousal. When children were 5 years old, they participated in a disappointment task designed to assess the child's self-regulation of negative emotion. The disappointment task began at the start of the visit with the child being asked to rank a series of small toys, then after several other tasks the child was presented with a brightly wrapped box containing one of the least preferred toys. The experimenter remained in the room while the child unwrapped the gift, then after 30 seconds left the room for 1 minute, and then finally returned to exchange the gift for a more preferred toy. The child's positive and negative facial expressions of emotion and specific regulatory strategies such as no strategy, distraction, mental reevaluation (the child finds something positive about the unwanted gift), and causal discussion (the child discusses the reasons and consequences for his or her emotional reactions) were coded

independently during the disappointment task. Mothers' regulatory strategies and child affect were coded during the 18 month and 30 month tasks. A proportion of the frequency of maternal strategy in response to the child's affect, or how often a strategy was used given the total number of turns that a child displayed positive or negative affect, and a proportion of each particular maternal strategy out of the total number of strategies were taken as measures of maternal regulation strategies. The child's affect was coded during each conversational turn (defined as all of one speaker's utterances bounding another speaker's utterances) on a 5-point scale ranging from high positive affect to high negative affect based upon vocalizations and facial expressions. Maternal strategies were compared to child affect for each conversational turn. The results showed that mothers tended to use more strategies in response to the child's negative affect at 18 months than at 30 months, and that specific strategies, such as distraction, granting the child's wish (meeting the child's needs or requests), and questioning the child's emotion were used most frequently. Mothers also used the specific strategies of soothing and acceptance of the child's affect more often in response to the child's positive affect than in response to the child's negative affect. Mothers' use of strategies with their 18- month-olds did not relate to children's positive facial expressions during the disappointment task; however, mothers who used more soothing and acceptance strategies with their 30-month-olds had children who displayed less positive affect during the disappointment task with the experimenter present. One specific maternal strategy, granting the child's wish at 18 months, was positively related to the child's negative affect during disappointment. Specific maternal strategies of soothing and acceptance with the 18 month-olds related to the child's use of distraction during the disappointment task. These findings indicate that

the mothers' responses to their children's affect may be related to later self-regulation of emotional responses, but it appears that these results are limited to only observing the mother's strategies in response to emotion rather than pre-emptive strategies, which may also be present and responsible for influencing children's ability to self-regulate emotions.

Observing maternal regulatory strategies and child's reactivity and strategies indicates that mothers' interactions are related to children's regulation, but it does not examine the temporal relations between maternal and child behavior, making it difficult to determine whether certain maternal strategies reliably precede changes in children's distress or their use of particular regulatory strategies. In general, these studies have found correlations between the types of strategies used by the children and the strategies used by the mother, but the direction of the interaction is lost. For example, a negative correlation between child distress and a particular maternal strategy, such as distraction from the frustrating stimulus, does not clearly indicate that maternal distraction reduces child distress. It may be that distraction is a regulatory strategy that reduces child distress, but it could instead be that mothers are more likely to use distraction when children are less distressed and to rely on other strategies, such as soothing or comforting, when children are more distressed. Thus, it is not clear how specific maternal behaviors may affect the child's subsequent level of distress and use of particular regulatory strategies, which is a necessary step in understanding how maternal behavior may influence the development of individual differences in children's emotion regulation.

A few studies have examined temporal relations between children's reactivity and regulatory strategies of the child, the mother, or both. Buss and Goldsmith (1998) used a

contingent analysis approach to analyzing the association between children's regulatory strategies and subsequent changes in reactivity in both fear- and frustration-eliciting tasks. Of the potential regulatory strategies that they examined only one, distraction, was negatively correlated with child distress. However, when contingent analyses were used, the child strategies of reach for toy, interaction with the stimulus, distraction, look to mother, and look to experimenter were followed by less increase and more decrease than expected in the expression of distress. Thus, all of these behaviors showed some effectiveness in regulating reactivity, findings that were not indicated by the correlations. These results indicate that contingent analysis is important in clarifying whether the use of hypothesized regulatory strategies does in fact precede decreases in reactivity.

Diener and Mangelsdorf (1999) used a similar sequential analysis approach as was used by Buss and Goldsmith (1998) and observed child strategies and changes in child affect in 18 to 24 month old children. In addition, Diener and Mangelsdorf manipulated the role of the mother (involved vs. uninvolved) to assess how maternal involvement was associated with changes in children's reactivity and their use of particular regulatory strategies. They coded child strategies and child affect when mothers were involved and uninvolved in both fear- and frustration-eliciting tasks. The mothers were asked to remain uninvolved for the first 3 minutes, which means that they were instructed to look busy completing questionnaires or reading magazines. After 3 minutes, mothers were signaled to interact with their children as they felt to be appropriate. Both child strategies and child affect were coded in 15-s coding epochs for the entire 6 minutes of each task. Results indicated that children used different strategies depending on whether the mother was involved or not involved. These results indicate

that the mother's involvement is associated with the strategy use of the child. However, specific maternal regulatory strategies were not coded, so their relation to children's reactivity or to children's use of particular regulatory strategies could not be examined. Changes in child reactivity were examined by looking for decreases or increases in children's negative affect in the epoch following a specific regulatory strategy used by the child. Each change was identified as an increase, decrease, or no change in negative affect by comparison to the previous epoch. Affect was coded by type (e.g., fear, anger, or positive) and intensity and was identified through observation of specific facial expressions, and vocalizations. The researchers then used chi-square analysis to compare the observed frequency of changes in affect after each strategy with the base rate of changes in affect when that specific strategy was not used. One strategy, fussing to mother, was reliably associated with subsequent decreases in child distress during both the mother involved and uninvolved parts of each fear and frustration task. The associations of other strategies with changes in child affect differed according to the type of task and the involvement of the mother. The results indicate a variety of individual differences in how particular child strategies may affect changes in child reactivity. One variable that may be related to some of these individual differences is the specific nature of maternal behavior in these situations. These results then raise the question of what specific strategies the mother is using and how these strategies may be associated with children's strategy use and changes in reactivity.

The only study to our knowledge that has looked at both mother and child strategies and subsequent changes in child affect was conducted by Leerkes and Crockenberg (2004), who implemented sequential analysis in a study of 6-month-olds

and their mothers during a fear-eliciting task. The infant and mother participated in two tasks that introduced novel toys designed to elicit negative emotional arousal. In order to attain a measure of how infants' behaviors and reactivity are affected by maternal involvement the mothers remained uninvolved for the first task and then were permitted to interact with their child during the second task. Mothers were allowed to soothe their child between tasks in order to reduce carryover effects. Infant affect and behavior were coded for both tasks, and discrete maternal behaviors were coded during the second task. Frequencies of co-occurrence were calculated across all dyads and examined for changes in child affect (reductions, calming, and escalations) following a particular maternal or child strategy. Pearson's chi-squares were used to determine if these probabilities were significantly greater than chance. When pooled analyses were significant, each dyad was examined individually to determine if the co-occurrences were greater than chance. These data were further analyzed by conducting sign-tests to determine if a significant number of infants had the same pattern of co-occurrence. Infants, who looked away from the toy, withdrew when mother was uninvolved, and self-soothed when mothers were involved showed co-occurrences with reductions in negative affect. In addition, contingent interactions between mother and infant were significant for certain behaviors. For example, mothers were more likely to use engagement with their infants when the infants looked away and support (soothing while maintaining the infant's attention on the toy), when the infants self-soothed. These contingencies were significant in the other direction as well, from infants' behavior to mothers' behavior. Overall, it was found that mothers who engaged contingently with their infant had infants who were less distressed during the tasks when compared to dyads who did not display this contingent interaction.

Sequential analysis preserves the temporal relation between regulatory strategies and changes in reactivity so that the contingent interactions are apparent when examining maternal behaviors and children's reactivity and regulatory strategies.

The present study will use sequential analysis in a study of 2-year-olds and their mothers in a frustration-eliciting task. Two-year-olds are typically at a developmental level in which autonomy is emerging but emotion regulation is still limited in flexibility in many situations (Kopp, 1982). The caregiver is still instrumental in providing guidance to the child. The present study will look at the pattern of associations between maternal strategies, child strategies, and subsequent changes in child reactivity in order to better understand the role of the mother in the development of individual differences in children's emotion regulation.

Hypotheses

Given the limited number of studies using temporally sensitive analyses to examine associations between child reactivity and both maternal and child regulatory strategies, as well as the findings of Diener and Mangelsdorf (1999) indicating that certain child strategies are associated with both increases and decreases in child reactivity, specific predictions are difficult. Based on the findings of previous literature (Buss & Goldsmith, 1998; Diener & Mangelsdorf, 1999) it was predicted that the strategy of distraction used by the mother or the child will relate to subsequent decreases in child reactivity. Mother and child strategies that focus the child's attention on the object of frustration or on the emotion itself, such as drawing the child's attention to the object of frustration, verbal explanation, or venting, may relate to increases in reactivity due to the seemingly opposite nature of these strategies from distraction. Children's use of the

strategy of self-soothing was also expected to relate to subsequent decreases in child reactivity, which was seen in Leerkes and Crockenberg (2004).

METHODS

Participants

Forty-three 24-month-olds and their mothers from a small city in the southeastern United States participated in the current study, which is part of a larger longitudinal study of emotional development in young children. The final size of the sample was lower due to a number of complications detailed below. The final analyses included thirty-two of the original forty-three mother-child dyads.

Participants were recruited mainly through public birth records as well as through area child care centers. Letters explaining the purpose and procedures of the study were mailed or distributed to families and a follow-up phone call was made. During the phone call, research assistants explained the procedures involved in the study, answered any questions the mother had, and scheduled a laboratory assessment if the mother agreed to participate. Participants were reimbursed 20.00 for their participation.

Materials and Procedure

The laboratory assessment took place in a room furnished with a chair and magazines for the mother, a small table and chair for the child, a larger table on which to place materials out of the child's reach, and a one-way mirror on the wall through which the assessment was videotaped.

The task designed to elicit frustration was adapted from Diener and Mangelsdorf (1999) and was implemented during a longer 2 hr assessment. The materials consisted of a small, clear Tupperware container containing goldfish crackers. The container was

impossible for the child to open, making the goldfish crackers visible but unattainable. When an assessment was scheduled, participants were asked if their children liked goldfish crackers and if they were acceptable to the parent. If not, a substitute snack that the child liked was provided.

Before the task began, the mother was given written instructions. The instructions asked the mother to sit in her chair and read magazines. She was also instructed not to initiate interaction with her child and to respond as briefly as possible if her child talked to her. The instructions stated that after a few minutes, the researcher would knock on the one-way mirror, at which time the mother should interact with her child as she normally would; however, the instructions also indicated that she should not open the container for her child. The mother was also informed that if she thought her child was becoming too distressed she should feel free to end the activity at any time. Once the mother had read the instructions and any questions had been answered, the research assistant re-entered the room holding the container. The researcher handed the child the container of goldfish crackers (or placed it in sight on the floor if the child would not take it). The child was told, “There’s a treat in here. You can have it in a few minutes.” The research assistant then left the room. After 3 min, the researcher knocked on the mirror to signal the mother to interact as she normally would. After 3 more min, the research assistant entered the room and opened the container for the child. If a child showed continuous crying for 15 s with no sign of calming and the mother had not ended the task, the researcher either signaled the mother to begin interacting (first 3 min) or entered the room and opened the container for the child (second 3 min), depending on when the child's distress occurred.

Due to several complications, data were available for 32 of 43 mother-child dyads. These complications included four mothers who did not follow the directions of the task and opened the container, two incidents of technical malfunctions resulting in a loss of data, two instances in which the task ended early due to the child becoming overly distressed and one instance in which the task was not administered due to child distress, one child who opened the container independently, and one child who was diagnosed with pervasive developmental delay after participating in the study.

Data Coding

The task designed to elicit frustration was coded from DVD recordings using a frequency-based coding system. The 6 min task was divided into two parts that were two minutes long and separated by the experimenter knock. The mother uninvolved condition began two minutes prior to the knock, and the mother involved condition began at the knock and lasted for two minutes. Each condition was divided into 5 s intervals, and each interval was coded for child affect and for child strategies; maternal strategies were also coded in 5 s intervals during the mother-involved condition of each task, when mothers were instructed to interact as they normally would with the child. Some dyads had shorter condition lengths due to the child becoming too distressed or mother opening the container for the child. Separate coders, who were unaware of the hypotheses of the study and other coding categories, coded maternal strategies, child strategies, and child affect. The coding systems for child strategies and maternal strategies were adapted from previous coding systems (Calkins et al., 1998; Diener & Mangelsdorf, 1999; Grolnick et al., 1998; Spinrad et al., 2004).

Child Affect

Child affect was rated in 5 s intervals on a 7-point Likert scale adapted from Braungart-Rieker and Stifter (1996) and Leerkes and Crockenberg (2004). The scale measured the intensity of infant affect based upon facial, vocal, and bodily expressions. Scores ranged from -3 (high negative) to +3 (high positive). Average and peak affect was calculated from these codes for use in the analyses. Average affect was calculated by averaging the affect scores coded in each interval by condition for a given dyad. Peak affect was derived from looking at the highest affect score coded during a condition for a given dyad. The coding manual is provided in the Appendix.

Child Strategies

Child strategy codes were adapted from Diener and Mangelsdorf (1999) and Calkins (1998) and included help seeking, engaging mother, distraction, leave-taking, self-soothing, venting, and focusing attention on the object of frustration. *Help seeking* included verbal requests for assistance. *Engaging mother* included attempts to involve the mother in an interaction, either by physical (e.g., climbing on lap) or verbal means (e.g., "Look!"). *Distraction* was defined as focusing attention on something other than the inability to obtain the frustrating object; instances where focus was on the mother were not coded as distraction but as engaging mother. *Leave-taking* was defined as the child's attempts to leave the room, either by verbal indicators (e.g., "I want to go home") or physical movement toward an exit. *Self-soothing* included self-manipulative behaviors such as rocking or thumb-sucking. Venting was defined as physical manifestations of distress, such as banging feet, hands, or other objects, or directing physical aggression toward the mother or objects in the room. *Focusing attention* on the object of frustration (focusing) was coded when the child looked at or played with the object that was meant

to induce frustration (goldfish container). These coding categories were modified or extended after coding data from pilot participants to reflect the coding manual in the Appendix.

Maternal Strategies

Maternal strategies were coded during the first 2 min after the knock of each 6 min task using coding systems adapted from other studies (Grolnick et al., 1998; Spinrad et al., 2004). Maternal strategies included drawing a child's attention to the frustrating object, distraction, soothing or comforting, verbal explanation, bribery, and observing child. *Drawing the child's attention to the object of frustration (attention)* included verbal references explicitly naming the object, as well as pointing or gesturing toward the object. *Distraction* was defined as engaging the child verbally in a topic other than the inability to obtain the object, or involving the child in an activity that was unrelated to the inability to obtain the object. *Soothing* and comforting included physical affection such as a gentle touch or vocalizations that attempted to calm the child. *Verbal explanation* included a reference to the behavior or emotion of the child and an explanation (e.g., "You are upset because you can't have that toy"). *Bribery* made reference to a future reward the child would receive if they complied with the mother's request (e.g., "Stop crying now and we can get ice cream on the way home"). *Observing* child included focusing visual attention on the child without responding to the child verbally or behaviorally. In addition to these codes adapted from prior research, two additional codes were identified and used in the current study. *Verbal command* was coded when the mother directed the child to regulate an emotion or behavior ("Stop crying." "Sit

down."). *Verbal question* was identified as questioning the child ("What's wrong?" "Where are you going?"). The coding manual is included in the Appendix.

If mother or child used more than one strategy within a 5 s interval, the first strategy that occurred was coded. The rationale for this rule was that the second strategy that occurred within an interval would carry over and be coded in the next interval. Within maternal and child strategy codes, each code was mutually exclusive; no strategies could occur simultaneously. In addition, the strategy codes were exhaustive, meaning that a strategy was coded in every interval (in the mother-involved condition, both a child and maternal strategy were coded). For the affect coding, ratings were also mutually exclusive and exhaustive. Coders of child affect, child strategies, and maternal strategies underwent training and established interrater reliability using pilot data as well as 15 percent of the subject data before beginning coding for the final analyses. The subject data was coded again, after establishing reliability, for use in the final analyses. Average reliability was established for each set of codes (child strategies, mother strategies, and child affect) using Cohen's kappa that ranged from .70 to .72 (M = .71).

RESULTS

The data analyses were separated into four main components. First, correlational analyses were conducted to examine relations between demographic variables (maternal age, maternal education, child gender) and maternal strategies, child strategies, and child affect by condition (i.e., mother-uninvolved versus mother-involved). Second, correlational analyses were conducted to examine associations between maternal and child strategies and child affect by condition. Third, Pearson's chi-squares were performed to assess whether a change in affect (increase, decrease, or no change) reliably

followed specific maternal or child strategies in each condition. Pearson's chi-square analyses were also conducted to identify sequences of mother and child strategies that occurred at greater than chance levels. Finally, the premise of a putative regulatory strategy is that it is followed by a decrease in distress or increase in positive affect. Therefore, perhaps a more effective strategy would have a more profound effect on the change in affect. Following this rationale, in order to examine if any one strategy was followed by a greater magnitude of change in affect, ANOVAS were conducted for both maternal and child strategies. An affect change score was calculated for each interval and linear mixed model ANOVAS were conducted to assess whether the average change in child affect differed significantly across maternal or child strategies.

Demographic Variables and Child Affect, Child Strategies, and Maternal Strategies

As described above, child affect was coded in 5-s intervals throughout the task. Child strategies were also coded in each interval for both the mother-involved and mother-uninvolved parts of the task. Maternal strategies were coded during the mother-involved portion of the task. Task length varied across dyads because child distress sometimes shortened one or both conditions. Therefore, proportion scores for maternal strategies, child strategies, and child affect ratings were calculated based on the total number of intervals coded for each dyad. Table 1 shows the descriptive statistics for mother strategies, child strategies and child affect. One maternal strategy, verbal question, never occurred and so was not used in any analyses.

The first set of correlations examined associations between demographic variables and child affect, maternal strategies, and child strategies. Due to the many correlational analyses conducted, a Bonferroni's correction was calculated, yielding an alpha level of

.001. Correlations were assessed for statistical significance using this value. Maternal age and education were not significantly correlated with mother or child strategies or with child affect or child peak intensity in either condition. Neither average child affect, child strategies, nor maternal strategies varied significantly by child gender in either condition. Therefore, child gender was not assessed in any further analyses. Finally, average child affect was not significantly different across the two conditions.

Relations between Child Affect, Child Strategies, and Maternal Strategies

The correlations among mother strategies and among child strategies within condition are presented in Table 2 and correlations between mother strategies, child strategies, and average child affect across conditions are presented in Table 3.

There were a few participants who demonstrated a high proportion of intervals in which one strategy occurred more often. These subjects were identified by inspection of boxplots and were considered outliers in the data for the particular strategy if the proportion of intervals for that strategy was greater than three box lengths, or the length of the interquartile range, from the upper or lower edge of the box. Outliers were not included in the relevant correlational analyses. Correlations were assessed for statistical significance using an alpha level of .001. Within the mother-uninvolved condition, there were no significant relations among child strategies. Within the mother-involved condition, child engaging was negatively correlated with child distraction. With respect to maternal strategies during the mother-involved condition, no maternal strategies were significantly related to any other maternal strategies.

In order to examine the stability of child strategies across conditions, correlations between the same child strategies were calculated across the mother-uninvolved and

involved conditions. Using an alpha level.of 001, child strategies were not significantly related across conditions. Correlations were then calculated between child strategies during the mother-uninvolved condition and maternal strategies (during the mother-involved condition). It is possible that mothers used certain strategies during the mother involved condition dependent upon their children's use of strategies or level of negative affect during the mother uninvolved condition, which always preceded the mother-involved condition; however, without counterbalancing the conditions this possibility cannot be evaluated. There were no significant correlations between child and maternal strategies within the mother-involved condition.

The final set of correlations examined how average child affect was related to child and maternal strategies within condition. Correlations were assessed for statistical significance using an alpha level of .001. Because of the rating system for coding child affect, higher affect scores indicated more positive affect (or less distress). During the mother-uninvolved condition, child distraction was positively correlated with child affect, indicating that increased use of child distraction was associated with greater positive affect. Child venting during this condition was negatively correlated with child affect, indicating that increased venting was associated with greater negative affect. With respect to maternal strategies, no strategies were significantly related to child affect.

The correlations between maternal strategies, child strategies, and average child affect offer some insight into associations between them, but the direction of effects cannot be concluded from these findings. For example, is child venting correlated with more negative child affect because it is a relatively ineffective strategy for reducing child distress or because children typically resort to venting when already distressed? To

examine whether specific maternal or child strategies reliably preceded a change in child affect, the affect rating for the interval following the use of a specific child or maternal strategy was examined. Changes in affect were classified as one of three types: increase, decrease, or no change. Increases in affect were identified when the affect code in an interval was at least one point higher on the Likert scale than in the previous interval. Decreases were identified as a point lower on the Likert scale, and no change was identified as the same point on the Likert scale. In order to determine if the mother and child strategies occurred reliably in combination with a certain level of affect, we used pooled data across all participants to examine the frequency of each type of affect change following the use of a given strategy. Both mother strategies and child strategies and their relation to changes in child affect were analyzed using this method. Separate Pearson chi-squares were conducted for each mother and child strategy by condition to determine if there was a significant association between specific strategies and subsequent changes in child affect (i.e., increases, decreases, or no changes). Observed frequencies for each strategy were compared to expected frequencies that were calculated from the chi-square matrix for the set of maternal or child strategies. The results of the chi square analyses are presented in Table 4.

The data yielded three patterns of changes in child affect that were similar to those identified by Diener and Mangelsdorf (1999). One strategy, child distraction during the mother-uninvolved condition, showed a "*maintenance pattern*" in which, upon visual inspection of the significant chi square, the number of observed instances of a strategy followed by no change in affect was greater than the number of expected frequencies, and the number of instances in which that strategy was followed by an

increase or decrease in affect was less than expected. The child strategies of engaging, leave taking, venting, and focusing in the mother uninvolved condition, as well as child venting in the mother involved condition, showed a "*regulatory pattern*" in which visual inspection of the chi-squares suggested that subsequent increases in child affect were observed at levels greater than chance. The third pattern of change was noted in the maternal strategy of focusing the child's attention on the object of frustration (attention). Visual inspection of the significant chi-square for this strategy showed that decreases in child affect occurred more often than was expected by chance following maternal attention, which indicates that this strategy was followed by an increase in distress in the child.

An additional set of chi-square analyses examined whether particular child strategies reliably followed particular maternal strategies, and whether specific maternal strategies followed specific child strategies in the mother-involved condition. Each coding interval was compared to the next interval to determine the number of times a maternal strategy followed a particular child strategy or a child strategy followed a particular maternal strategy. Then every possible sequence of strategies was analyzed to determine if the number of times a specific strategy occurred after another specific strategy was greater than was expected by chance. The results of these chi-square analyses are presented in Table 5. The chi-square analyses were significant for maternal attention, distraction, soothe, and observe as well as for child help-seeking, distraction, leave taking, and focus. These chi-squares analyses were also visually inspected to determine which cell(s) appeared to be responsible for the significant findings. Maternal attention was followed by child focus more often than was expected by chance. Maternal

distraction was followed less often by child vent and focus, and more often by child engage, than was expected by chance. Maternal soothe was followed by child distraction less often than was expected by chance. Maternal observe was followed by child distraction more often and child engage less often than expected by chance. Child help-seeking was followed by maternal attention more than expected by chance. Child distraction was followed by maternal observe more than expected by chance. Child leave taking was followed by maternal command more often than expected by chance. Child focus was followed by maternal attention more than was expected by chance.

The final set of analyses examined whether the magnitude of change in child affect varied across specific maternal or child strategies. The affect rating for the interval following the use of a specific maternal or child strategy was examined and an affect change score was calculated for each interval by taking the difference between the affect rating in the interval in which a specific strategy was coded and the affect rating in the subsequent interval. Each change score represented the magnitude (amount) of affect change that occurred following a particular strategy. For example, an interval in which child venting occurred might contain an affect rating of –1 and the next interval might contain an affect rating of –3; therefore, the magnitude of affect change that occurred was +2. Using pooled data across all participants, ANOVAS were calculated separately for mother strategies and child strategies to compare the magnitude of change in affect following a particular strategy and whether these changes differed significantly across strategies. These analyses used a linear mixed model in which the maternal or child strategies were factors (fixed variables), subject number served as a random variable, and the dependent variable was the affect change (difference) scores. The mean affect change

scores for all maternal and child strategies are presented in Table 6. Amount of change in affect following the maternal strategies did not differ significantly between strategies $F(6, 702) = 1.56$, $p > .05$, nor did the amount of change in affect following the child strategies differ significantly between strategies $F(7, 1414) = 1.291$, $p > .05$. Thus, it appears that all mother and child strategies had a similar impact on the magnitude of child affect change.

DISCUSSION

Emotion regulation is identified by a change in observed affect following a putative regulatory strategy. Previous research has noted that the mother's presence during an emotionally arousing task is related to the types of regulatory strategies that the child employs (Diener & Mangelsdorf , 1999; Grolnick et al., 1998; Spinrad et al., 2004). The findings of this study are consistent with some findings of previous research. The specific findings from both the correlational analyses and the sequential analyses will be discussed in reference to the specific hypotheses of this study and the findings of previous literature. The ANOVA analyses will also be discussed in order to indicate the need for multiple and alternative statistical measures that can capture the effects of regulatory strategies within emotionally arousing situations. Limitations and future directions for this study will also be addressed.

Relations of Strategies and Child Affect

There were two child strategies that were correlated within the mother-involved condition and not in the mother uninvolved condition, which suggests that mother involvement affected the use of certain child strategies. Child distract was negatively related to child engage when the mother was involved. Thus, children who engaged the

mother in an interaction were less likely to independently distract. In this condition, the presence of the mother may have offered an alternative to using strategies that required independent regulation of emotional arousal. This finding is consistent with past research indicating that children use engagement more often when a caretaker is available (Diener & Mangelsdorf, 1999).

There were two child strategies that were correlated with affect scores during the mother uninvolved condition. Child distraction was associated with higher affect levels and child venting was associated with lower affect levels. These findings are consistent with previous research that suggests that child distraction is associated with less distress (Buss & Goldsmith, 1998; Calkins et al., 1998; Leerkes & Crockenberg, 2004) while child venting is correlated with more distress (Calkins et al., 1998). The chi-square analyses, however, indicated that distraction was associated with a maintenance pattern rather than with subsequent increases in affect during the mother uninvolved condition. The latter finding suggests that the use of distraction may help to prevent subsequent decreases in affect even if it is not associated with an actual decrease in distress. The chi-square analysis for child venting during the mother uninvolved condition suggested that venting was followed by more increases in affect (more positive affect) more often than expected by chance. The difference between the correlational and chi-square analyses indicates the importance of examining sequential relations between putative regulatory strategies and changes in affect, since strategies that are correlated with measures of affect may not actually be temporally related to changes in affect or may be related differently to the direction of affect change in correlational versus sequential analyses (Buss & Goldsmith, 1998).

Sequential Analyses

Based upon previous literature (Buss & Goldsmith, 1998; Diener & Mangelsdorf, 1999), this study hypothesized that maternal and child use of distraction would be followed by a decrease in children's negative affect. Calkins et al. (1998) also noted that in a negative emotion-eliciting task, child negative affect was negatively related to child distraction and positively related to child venting. These results were replicated in the current study, with child affect scores (higher scores indicating less negative affect) positively correlating with distraction and negatively correlating with venting in the mother uninvolved condition. These two strategies appear to have contradictory effects on the level of child affect, which indicates that each may serve a different function in managing emotional arousal. Distraction is related to an increase in child affect, and therefore could aid in problem solving situations in which it is necessary to maintain a lower level of arousal. Venting, on the contrary, is related to a decrease in child affect, and therefore may aid to obtain a goal through upregulation of emotional arousal. It is important to identify the context in which the emotion occurs, which in this case involves looking also to what the mother is doing within the context.

Calkins et al. (1998) found that maternal negative control was not related to child reactivity directly, but was positively related to child focusing on the object of frustration, and negatively related to child distraction. In the present study, the sequence of mother-child strategies indicated that when mothers observed their children without interfering first, the children used distraction, which was positively related to child affect scores. These findings suggest that mothers who use more observation and less direct involvement with their children will foster the use of strategies such as distraction that

relate to higher affect or lower distress. These findings are consistent with those of Spinrad et al. (2004) and Grolnick et al. (1998) and suggest that mothers who interact minimally with their children during an emotionally arousing situation have children who are less distressed in emotionally arousing situations that require independent regulation.

The findings of the current study are also consistent with those of Diener and Mangelsdorf (1999), who found that child leave taking during a frustration task when mother was uninvolved was consistent with a "regulatory pattern" in which subsequent increases in positive affect occurred more often than expected by chance. In the current study, child leave taking when the mother was uninvolved was followed by an increase in affect more often than expected by chance. A possible explanation for this finding may be that mothers were instructed to respond minimally to their children during the mother-uninvolved condition. During the mother-uninvolved condition, child leave taking may not have initiated a response from the mother; thus, the child was able to engage in this strategy alone (i.e., attempting to get over the baby gate), which was followed by an increase in affect. The correlational analyses do not provide any significant evidence of a relation between any mother strategies and child leave taking, but mother command and mother question reliably followed the strategy of child leave taking in the chi square analyses for the contingent strategies. The chi-squares also indicate that these findings are the result of only a few mothers responding in this way to their child's strategy of leave taking.

Based on previous literature (Leerkes & Crockenberg, 2004), it was hypothesized that child soothing would be followed by decreases in child reactivity, or increases in child positive affect. The correlational analyses indicated that child soothing did not

relate to child affect. The sequential analyses were also nonsignificant for this strategy. Leerkes and Crockenberg (2004) found that infant soothe co-occurred with decreases in negative affect during the mother-involved condition. In their study, the strategy of infant soothe was created by collapsing several strategies that included soothing while looking at mom, soothing while looking at the object, as well as self-soothing. In the present study, the strategy of child soothe only involved instances in which the child self-soothed, which may partially explain why the findings differ.

A major goal for this study was to identify not only the effect of the presence of the mother, but also to identify the specific behaviors used by the mother in the context of the emotionally arousing task. The chi-squares for the strategies show that one maternal strategy, maternal attention, was followed by decreases in child affect. This finding is similar to the finding of Grolnick et al. (1998) who found that mother's active engagement was related to children's increases in distress. It could be that mothers who focused their child's attention on the object of frustration re-established the frustrating event. Leerkes and Crockenberg (2004) found that children who looked-away from the frustrating object also had mothers who encouraged re-direction of attention, and this strategy was followed by decreases in child distress. Therefore, the opposite may have occurred in this study, which was that when the mother was involved and directing the child's attention to the object, the child's distress was increased.

Alternative Analysis of Emotion Regulation

Emotion regulation is often conceptualized as an increase in affect, or decrease in distress, following a particular regulatory strategy. However, as Diener and Mangelsdorf (1999) point out, "conceptualizations of empirical research on emotion regulation need to

include the idea that emotion regulation involves not just the inhibition or dampening of negative affect, but also encompasses the maintenance and enhancement of emotion"(p 580). A level of affect that did not differ from the previous interval more often than expected by chance followed all child and maternal putative regulatory strategies that were defined in this study. These findings do not indicate that these strategies serve no regulatory function, but instead suggest that emotion regulation may include strategies that maintain a level of affect as opposed to decreasing distress or increasing positive affect. The range of affect scores shows that there were intervals of extreme negative affect in both conditions. However, the nonsignificant ANOVAS signify that mother and child strategies in each condition did not differ significantly in the average affect change that followed each strategy. Thus, it appears that no one strategy was differentially effective in changing the levels of child affect. It seems important in future studies to consider the consistency in the affect level following specific strategies in order to understand the effects of putative regulatory strategies.

Limitations and Future Directions

This study attempted to determine if mother and child strategies co-occur reliably with a certain level of affect. To some extent, this study replicated previous findings in support of the regulatory function of certain strategies. However, this study did not find significant differences between the amount of affect change and the types of strategies that preceded the affect change. The small sample size is a major limitation of this study, and affected the statistical power of the analyses. Future studies should use a larger sample, as well as a more ethnically and socioeconomically diverse sample in order to attain greater variability and more externally valid results. This study further emphasized

the importance of looking to specific strategies for both the mother and the child in order to better understand the nature of putative regulatory strategies. Future studies should focus on defining the nature of these strategies and how they relate to changes in affect. Specifically, studies could identify the differences between the strategy of distraction and focusing on the object of frustration, which have seemingly opposite effects on the level of child reactivity.

The present study used an interval based coding system to observe the sequence of strategies and changes in affect that occurred during an emotionally arousing task. Coding the data in this way allows sequential analyses to be used in order to better capture the temporal relations between mother and child strategies and changes in child affect. Pearson's chi-squares analyses have been the most widely used method for sequential analyses in the emotion regulation literature (Buss & Goldsmith, 1998; Diener & Mangelsdorf, 2000; Leerkes & Crockenberg, 2004). This study also used an additional analysis, linear mixed model ANOVA, in order to examine the differential effectiveness of strategies in changing child affect. Future studies should explore other analytic tools, such as calculating conditional probabilities for given strategies and changes in affect, in order to establish the nature of regulatory strategies.

Finally, this study found that the presence of the caregiver affected the use of certain strategies in children, and in turn affected child affect. However, this study is limited to describing only the effects of regulatory strategies used by mothers and not those that may be used by fathers. Mothers have been conceptualized as the primary caregiver in the first few years of life (Calkins, 1994), and therefore literature has focused solely on the mother's contributions to children's emotion regulation. Fathers may also

be instrumental in helping to foster more effective use of strategies in their children, and therefore research should also include fathers when assessing the effect of the caregiver in influencing emotion regulation.

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APPENDIX

Coding Manual

If more than one code occurs within an interval, coders should code the first strategy or level of affect that occurs. (Rationale: strategies/affect that start at the end of one interval will be the first to occur in the next interval)

Mother Strategies –

1 = *Drawing the child's attention to the object of frustration* - verbal references explicitly naming the object, as well as pointing or gesturing toward the object.

2 = *Distraction* - engaging the child verbally in a topic other than the inability to obtain the object, or involving the child in an activity that is unrelated to the inability to obtain the object.

3 = *Soothing and comforting* - pleasant physical affection such as a gentle touch and pleasant tone in vocalizations that attempt to calm the child.

4 = *Verbal explanation* - a reference to the emotion of the child and an explanation (e.g., "You are upset because you can't have that toy").

5 = *Bribery* - reference to a future consequence the child will receive **if** they comply with the mother's request

6 = *Observing child* - focusing attention on the child, and not ignoring the child, but not responding to the child verbally or behaviorally.

7 = *Verbal command* – direct child to regulate emotion or behavior

8 = *Verbal question* – questioning the child

Child Strategies –

1= *Help seeking* - verbal requests for assistance.

2= *Engaging mother* - attempts to involve the mother in an interaction, either by physical (e.g., climbing on lap) or verbal means (e.g., "Look!").

3= *Distraction* - focusing attention on something other than getting the frustrating object (instances where focus is on the mother will not be coded as distraction).

4= *Leave-taking* - child's attempts to leave the room, either by verbal indicators (e.g., "I want to go home") or physical movement toward an exit.

5= *Self-soothing* - self-manipulative behaviors such as rocking or thumb sucking.

6= *Venting* - physical manifestations of distress, such as banging feet, hands, or other objects, or directing physical aggression toward the mother or objects in the room.

7= *Focusing attention on object of frustration* - looking at or attempting to get into the object of frustration, and the child does so without involving the mother.

Child Affect –

+3= high positive – overly excited cheerful vocal tone and gestures

+2= moderate positive – continuous excitement/amusement or smile or laughing

+1= mild positive – mild smile or excitement in tone or intermittent excitement

0= neutral - no clearly negative or clearly positive vocalizations or facial expressions

-1= mild negative - mild or intermittent whimper/fuss and/or one cry, frown, saying "no"

-2= moderate negative - continuous crying or sobbing

-3= high negative - shrieking, hysterical crying

	Min	Max	M	SD
Child (M Uninvolved)				
Help seeking	.00	.50	.05	.11
Engaging	.00	.83	.30	.23
Distraction	.00	1.00	.37	.31
Leave taking	.00	.17	.02	.04
Self soothe	.00	.22	.01	.04
Venting	.00	.58	.07	.13
Focusing	.00	.46	.18	.15
Affect	-2.92	.32	-.77	.87
Peak neg affect	-3.00	.00	-1.69	1.18
Child (M Involved)				
Help seeking	.00	.17	.02	.04
Engaging	.13	1.00	.78	.19
Distraction	.00	.61	.10	.14
Leave taking	.00	.09	.01	.02
Self soothe	.00	.05	.00	.01
Venting	.00	.27	.04	.07
Focusing	.00	.32	.05	.08
Affect	-2.17	.48	-.57	.69
Peak neg affect	-3.00	.00	-1.88	1.04
Mother				
Attention	.00	.39	.09	.12
Distraction	.00	.74	.23	.19
Soothing	.00	.57	.08	.15
Explanation	.00	.00	.00	.00
Bribe	.00	.48	.06	.11
Observing	.00	.57	.24	.19
Command	.00	.35	.11	.10
Question	.00	.64	.20	.15

Table 1. Descriptive Statistics for Mother Strategies, Child Strategies, and Child Affect by Condition (N=32)
Note. Numbers for maternal and child strategies represent proportions of intervals.

Child (m uninvolved)	Help	Engage	Distract	Leave	Soothe	Vent
Engage	-.12					
Distract	-.32	-.59				
Leave	-.14	.04	.06			
Soothe	-.10	-.11	-.16	-.15		
Vent	.07	-.03	-.44	-.13	.20	
Focus	.24	-.16	-.47	-.19	.14	.04

Child (m involved)	Help	Engage	Distract	Leave	Soothe	Vent
Engage	-.06					
Distract	-.24	-.58***				
Leave	-.15	-.24	.02			
Soothe	-.10	.04	-.19	.23		
Vent	-.04	-.54	-.17	.27	.18	
Focus	.05	-.53	-.23	.08	-.07	.50

Mother	Attention	Distract	Soothe	Bribe	Observe	Command
Distract	-.29					
Soothe	-.13	-.13				
Bribe	-.17	-.19	.04			
Observe	.04	-.20	-.50	-.26		
Command	-.19	-.39	-.05	.07	.02	
Question	-.11	-.28	-.08	-.12	-.33	-.02

Table 2. Correlations of Mother Strategies and Child Strategies within Conditions
***p<.001.

	Child (m uninvolved)								Child (m involved)							
Mother	Help	Eng	Dist	Leave	Soothe	Vent	Focus	Affect	Help	Eng	Dist	Leave	Soothe	Vent	Focus	
Attend	-.07	.00	.09	-.11	.01	.04	.38	.00	.29	.04	-.21	-.22	-.14	-.16	.12	
Dist	-.22	.29	.03	-.05	.36	-.04	-.16	.29	-.19	.16	.03	.03	.02	.07	-.30	
Soothe	.44	-.59	-.36	-.15	.32	.30	.09	-.59	.40	.10	-.34	-.08	.27	.12	.07	
Bribe	.28	-.34	-.29	.13	-.12	-.07	.06	-.34	.10	.04	.01	-.12	-.15	-.03	-.03	
Obs	-.32	.35	.34	.01	-.34	-.22	-.08	.35	-.31	-.28	.47	-.03	-.18	-.16	.00	
Comm	.08	.09	.04	.29	-.11	-.22	.04	.09	-.14	-.02	.00	.19	-.01	.00	.14	
Quest	.05	-.03	.01	.00	-.20	.19	-.16	-.03	.02	.00	-.14	.20	.16	.13	.15	
Affect	-.37	-.31	.74***	.06	-.02	-.85***	-.20		-.26	.22	.26	-.02	.05	-.36	-.48	
Child (m involved)																
Help	.75	-.20	-.25	-.14	.05	.03	.27									
Eng	-.05	-.02	.06	-.12	.06	-.04	.00									
Dist	-.27	.04	.40	.06	-.17	-.17	-.50									
Leave	-.11	.33	-.17	.42	.00	.03	-.20									
Soothe	-.11	.09	-.22	.21	.49	.20	.03									
Vent	.08	.03	-.27	.09	.04	.21	.23									
Focus	.17	.01	-.32	-.03	.04	.13	.41									

Table 3. Correlations of Mother Strategies, Child Strategies, and Child Affect across Conditions
***p<.001.

	Increases	No change	Decreases	Chi-Square
Child (m uninvolved)				
Help seeking	6 (2.89)	22 (21.79)	3 (4.29)	3.73
Engaging	41 (17.56)	116 (136.37)	37 (26.82)	38.21**
Distraction	25 (17.06)	214 (183.47)	22 (36.08)	14.27**
Leave	4 (0.48)	4 (6.33)	1 (1.24)	26.57**
Soothe	2 (0.53)	8 (7.73)	1 (1.52)	4.25
Venting	13 (2.21)	22 (33.74)	13 (6.64)	62.92**
Focus	17 (3.55)	92 (88.57)	17 (17.42)	51.18**
Child (m involved)				
Help seeking	4 (2.30)	6 (7.54)	2 (2.16)	1.59
Engage	104 (105.54)	353 (346.12)	94 (99.34)	0.45
Distract	8 (13.60)	50 (44.60)	13 (12.80)	2.96
Leave	0 (1.15)	3 (3.77)	3 (1.08)	4.71
Soothe	0 (0.38)	2 (1.26)	(0.36)	1.18
Venting	12 (5.17)	9 (16.96)	6 (4.87)	13.01**
Focus	8 (7.85)	23 (25.75)	10 (7.39)	1.22
Mother				
Attention	9 (12.64)	36 (41.46)	21 (11.90)	8.73*
Distract	29 (30.84)	101 (101.14)	31 (29.03)	0.24
Soothe	13 (11.49)	41 (37.69)	6 (10.82)	2.63
Bribe	9 (8.62)	25 (28.27)	11 (8.11)	1.42
Observe	37 (32.56)	104 (106.79)	29 (30.65)	0.77
Command	13 (14.56)	50 (47.74)	13 (13.70)	0.31
Question	26 (25.28)	89 (82.92)	17 (23.80)	2.41

Table 4. Observed and Expected Frequencies for Changes in Child Affect Following Mother and Child Strategies by Condition
*p<.05 . **p<.01.

Maternal strategies next

Child strategies first	Atten	Dist	Soothe	Bribe	Obs	Comm	Quest	Chi Square
Help	5 (1.30)	0 (3.16)	4 (1.18)	1 (.89)	1 (3.36)	1 (1.50)	2 (2.61)	22.31**
Eng	48 (49.99)	137 (121.18)	49 (45.44)	38 (34.08)	116 (128.76)	50 (57.56)	99 (99.98)	5.14
Dist	0 (7.63)	20 (18.50)	0 (6.94)	1 (5.20)	35 (19.66)	12 (8.79)	14 (15.27)	31.33**
Leave	0 (.47)	0 (1.13)	0 (.42)	0 (.32)	0 (1.20)	3 (.54)	2 (.93)	16.09*
Soothe	0 (.19)	0 (.45)	1 (.17)	0 (.13)	0 (.48)	0 (.21)	1 (.37)	6.59
Vent	1 (2.70)	2 (6.54)	4 (2.45)	2 (1.84)	7 (6.95)	7 (3.11)	6 (5.40)	10.15
Focus	12 (3.72)	1 (9.03)	2 (3.39)	3 (2.54)	11 (9.59)	3 (4.29)	8 (7.45)	26.82**

Child strategies next

Maternal strategies first	Help	Eng	Dist	Leave	Soothe	Vent	Focus	Chi Square
Atten	2 (1.04)	49 (49.82)	0 (6.43)	0 (.47)	0 (.09)	4 (2.36)	9 (3.78)	16.23*
Dist	1 (2.47)	132 (118.32)	16 (15.27)	0 (1.12)	0 (.22)	0 (5.61)	3 (8.98)	13.43*
Soothe	3 (.93)	45 (44.37)	1 (5.73)	0 (.42)	1 (.08)	1 (2.10)	6 (3.37)	21.57**
Bribe	0 (.71)	37 (34.25)	2 (4.42)	0 (.32)	0 (.06)	4 (1.62)	1 (2.60)	7.11
Obs	1 (2.70)	110 (129.22)	35 (16.67)	3 (1.23)	0 (.25)	5 (6.13)	12 (9.81)	27.58**
Comm	2 (1.15)	50 (55.27)	8 (7.13)	0 (.52)	0 (.10)	7 (2.62)	4 (4.19)	9.18
Quest	2 (2.00)	104 (95.75)	6 (12.35)	2 (.91)	0 (.18)	4 (4.54)	5 (7.27)	6.25

Table 5. Observed and Expected Frequencies for Child Strategies Following Mother Strategies and for Mother Strategies Following Child Strategies
*p<.05 . **p<.01.

Maternal Strategies	Number of Observations	Mean Affect Change Score	Std. Dev.
Attention	66	1.89	.68
Distract	160	2.01	.59
Soothe	60	2.10	.54
Bribe	45	2.07	.65
Observe	170	2.08	.61
Command	76	1.93	.64
Question	132	1.98	.58
Child Strategies	N	Mean	Std. Dev.
Help	45	1.93	.69
Engage	753	2.00	.65
Distract	344	1.94	.59
Leave	19	2.11	.66
Soothe	13	2.08	.49
Vent	76	1.92	.83
Focus	171	1.90	.66

Table 6. Magnitude of Affect Change Following Specific Maternal or Child Strategies